**5E Planning Guide for Inquiry Teaching!**

**Academic Language:**

* Fossil
* Paleontologist
* Decompose
* Sedimentary rock
* True form fossil
* Amber fossil
* Mold fossil
* Cast fossil
* Trace fossil
* Index fossil

**Procedural Language:**

* Describe
* Create
* Discuss
* Represent
* Discover
* Compare
* Contrast

**Your Name:** Heidi Taviano  **Unit Name:**  Fossils **Lesson Name:** What Scientists Can Learn From Studying Fossils

**Learner outcomes: (content and inquiry – measurable). The students will:**

* Distinguish characteristics between two fossils that are from different time periods or different locations.
* Create drawings of new fossils and describe their findings to a paleontologist through a letter.
* Demonstrate what they learned by completing an assessment probe through an activity called ‘commit and toss’.

**Grade Level Standards, Grade, Theme, & Topic**

*Standard (highlight one):* Earth Life Physical

*Grade:* 4th Grade

*Grade Band Theme*: Interconnections within Systems

*Topic:* Earth’s Living History

**Condensed Content Statements**

* Fossils can be compared to one another and to present-day organisms according to their similarities and differences.

**Science Inquiry and Application**

* Communicate about observations, investigations and explanations.
* Review and ask questions about the observations and explanations of others.
* Observe and ask questions about the natural environment.

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| **5-E Phase** | **Planned Activity/Event** | **Guiding Questions** | **Notes: Materials, Safety, Modifications** |
| **Engage Time: 45 min**   * Tap prior knowledge * Focus learner’s thinking * Spark interest in topic | * As a class, read a story about Mary Anning, a female paleontologist. * Students will answer discussion questions that will lead into the lesson. * Students will also write their own stories about being a historic paleontologist. * If time permits, students will share their stories. | * Can you predict by looking at the picture why Mary Anning is an important person in history? * If you didn’t know what a fossil was, what might you predict that it was? * Would you continue looking for fossils in an area even if you knew it was dangerous? What strategies would you use during your exploration? * What can scientists learn from studying fossils? | * Materials: the book *Mary Anning: Fossil Hunter*, paper and pencils to write stories * Safety/Rules: students should be reminded to remain in their seats and to respect others ideas * Modifications: Struggling readers should be provided with copies of the text to follow along with. Visual learners should be provided with the images found in the text. |
| **Explore Time: 30 min**   * Provide learners with common, concrete, tactile experiences with skills and concepts * Observe and listen to students * Ask probing questions * Act as a consultant | * In pairs, students will make observations and answer questions about different fossils. * They will be asked to determine classify several characteristics, as well as to compare and contrast fossils from different periods of time and locations. * Students who are not making observations will be completing a worksheet. | * How do you think these fossils were created? * How are these fossils are alike? * How are they different? * Do you think they are from the same period of time? * Do think they formed in the same location? * Do you think they are similar organisms? * What organism do you hypothesize that this fossil represents? | * Materials: comparative fossils, handout, worksheet, extra reading material * Safety/rules: do not put the fossils in your mouth, do not throw or toss the fossils in the air, work cooperatively and respect others * Modifications: have advanced students lead their own discussion about the fossil characteristics, while other students are provided with guided questions. Also, provide students struggling with the material with prompting questions, while they complete their worksheet. Students who complete handout early will be provided with material to read about fossils. |
| **Explain Time: 45 min**   * Encourage students to explain concepts in their own words * Ask for justification * Use students previous experiences as the basis or explaining concepts * Clarify and correct misconceptions | * Have students present their findings. * Read handout about fossils (pages 176-183) * Students will take notes * Complete a graphic organizer * Explain to students the differences and similarities of the comparative fossils. | * How did the fossils compare to each other? * How do you think fossils are made? * Do you think there are different types of fossils? * What might these fossils tell us about the environment they formed in? * What can fossils tells us about past life on Earth? * What can scientists learn from studying fossils? | * Materials: Fossil reading handout, notes, graphic organizer * Safety/rules: stay in your seats, participate, and respect others * Modifications: provide struggling readers with guided notes, rather than having them take their own notes; provide students on IEP’s with a partially completed graphic organizer. |
| **Extend Time: 15 min**   * Apply same concepts and skills in a new context resulting in deeper and broader understanding * Encourage the students to apply the concepts/skills to new situations | * Students will create their own drawings of a new fossil that they discovered. The drawing should also be of the location that the students found the fossil in. * Students will write a letter to a paleontologists describing this new fossil. | * What have you learned about the past by discovering this fossil? * How might this fossil compare to one of a different time period or location? * How do you think this fossil formed? * What animal does this fossil represent? * What time period does this fossil pertain to? * What might this fossil tell you about the environment that the organism lived in? | * Materials: worksheet, coloring tools * Safety/Rules: remain in seats, unless given permission to get up, and respect others ideas * Modifications: Provide students on IEP’s with unknown fossils that were discovered and have them write letters to a paleontologist describing their discovery. |
| **Evaluate Time: 45 min**   * Observe as students apply new concepts and skills * Assess, formally and/or informally student progress toward achieving the learner outcomes * Assess students’ knowledge and/or skills * Allow students to assess their own learning and group process skills | * Students will complete the Mountaintop Fossil probe by using the formative assessment Commit and Toss. * Review for test. | * Why do you agree with this person? * Why is there now a mountain where an ocean was? * How does water and ice naturally move? (uphill or downhill?) * Did the paragraph mention a volcano that use to be present in this area? * If more than one person found a fossil like this, would you still agree with Mrs. Esposito? | * Materials: probe, formative assessment, paper, pencils * Safety/Rules: remain in seats, unless given permission to get up, and respect others ideas * Modifications: Allow struggling writers to first describe their thoughts to you, and then encourage and assist them to write their thoughts down on paper. |